

**TECHNICAL REVIEW AND EVALUATION FOR  
TUCSON ELECTRIC POWER, SPRINGERVILLE GENERATING STATION  
SIGNIFICANT PERMIT REVISION #47190  
(REVISION TO OPERATING PERMIT NO 32008)**

**I. INTRODUCTION**

This Class I, Title V significant permit revision for Tucson Electric Power (TEP), Springerville Generating Station (SGS) authorizes the company to install and operate four new evaporative water spray (EWS) systems on five evaporation ponds at SGS located in Apache County, Springerville, Arizona. The Springerville Generating Station is classified as a Class I, Major Source. This permit application is a significant permit revision of Air Quality Permit #32008.

The EWS system addition meets the requirements of A.A.C. R18-2-320 and as such necessitates this significant permit revision.

**A. Company Information**

Facility Name: Tucson Electric Power Company  
Springerville Generation Station

Mailing Address: 3950 East Irvington Road (85714)  
Mail Stop DS503  
PO Box 711  
Tucson, AZ 85702

Facility Location: 10 miles north of Springerville on Highway 191; 12 miles east on site access road, Springerville, Apache County, AZ

**B. Attainment Classification (Source: 40 CFR §81.303)**

Tucson Electric Power, Springerville Generating Station is located in an area that is either unclassified or classified as being in attainment for all criteria air pollutants.

**II. FACILITY DESCRIPTION**

**A. Process Description**

The SGS operations include three constructed coal-fired steam electric generating units. Units 1 and 2 have a 380 net megawatt (MW) output and Unit 3 has a 400 net MW output. Each unit typically operates 24 hours per day, 7 days per week, and 365 days per year. Unit 4 (400 MW output) is currently under construction. In addition to the pulverized coal-fired steam electric generating units, SGS includes various ancillary facilities such as an oil-fired auxiliary boiler, a coal preparation plant, coal storage piles, anhydrous ammonia storage tanks, lime storage and handling facilities, and four mechanical-draft wet cooling towers.

This significant permit revision is for the installation of four (4) new evaporative water spray systems on five ponds at SGS. The spray evaporation systems are needed to enhance evaporation from the ponds to maintain the minimum freeboard required by the facility aquifer protection permit. The spray pumps will take suction from the ponds and pump the water to spray headers (nozzles) on support docks (floats). The water will be sprayed in a

predetermined pattern to minimize spray plume interference with the floating platforms. The spray systems generate droplets with high surface area which enhances evaporation.

### III. EMISSIONS

The SGS has the potential to emit (PTE) criteria air pollutants, including nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), particulate matter (PM and PM<sub>10</sub>), volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>), in excess of 100 tons per year. The facility is classified as a Major Source pursuant to Arizona Administration Code (A.A.C.) R18-2-101.64. Therefore, the plant is a major source for the purposes of the Title V program and a major stationary source for the purposes of the Prevention of Significant Deterioration (PSD).

The plant is a major source of HAP emissions, with potential emissions greater than 10 tons per year for any single HAP and greater than 25 tons per year for total combined HAP.

This application addresses emissions of particulate matter between 10 and 30 microns in diameter (PM<sub>30</sub>) from the four new evaporative spray systems at the SGS's five wastewater evaporation ponds. The spray system nozzles do not generate particles sized less than 10 microns and particles larger than PM<sub>30</sub> are not subject to regulation. In addition, particles larger than PM<sub>30</sub> are not anticipated to travel off-site of the facility. Emissions were estimated using spray nozzle vendor size distribution specifications and flow rates along with accepted engineering (Perry's) calculation methods to determine potential emissions at various conditions. Initially, the ponds systems will be operating at a 2% salt concentration, yielding a PM<sub>30</sub> PTE of 608 TPY. Subsequent to startup, the ponds' salt concentration is anticipated to increase, with the worst case scenario at 13.2% concentration yielding a PM<sub>30</sub> PTE of 1,978 TPY. Table 1 summarizes calculated potential PM<sub>30</sub> emission increases for the new evaporative spray systems.

**Table 1: Summary of PM<sub>30</sub> Emissions to Ambient Air at Various Initial Salt Concentrations**

Salt Concentration	PM <sub>30</sub> Emissions	PM <sub>30</sub> Emissions
Percentage	Tons per Year (1 Pond)	Tons per Year (4 Ponds)
2	152	608
5	381	1526
13.2	494	1978
26	223	890

- Please refer to Significant Revision Application for detailed emission calculations.

### IV. BACT ANALYSIS

The term "best available control technology" is defined in A.A.C. R18-2-101.19 as "an emission limitation, including a visible emissions standard, based on the maximum degree of reduction for each air pollutant listed in R18-2-101.97(a) which would be emitted from any proposed major source or major modification, taking into account energy, environmental, and economic impact and other costs, determined by the Director in accordance with R18-2-406.A.4 to be achievable for such source or modification."

The procedures for establishing BACT are set forth at A.A.C. R18-2-406.A.4 as “BACT shall be determined on a case-by-case basis and may constitute application of production processes or available methods, systems, and techniques for control of such pollutant. In no event shall such application of BACT result in emissions of any pollutant, which would exceed the emissions allowed by any applicable new source performance standard or national emission standard for hazardous air pollutants under Articles 9 and 11 of this Chapter.”

The Department generally uses what is termed a “top-down” procedure when making BACT determinations. This procedure is designed to ensure that each determination is made consistent with the two core criteria for BACT: consideration of the most stringent control technologies available, and a reasoned justification, considering energy, environmental and economic impacts and other costs, of any decision to require less than the maximum degree of reduction in emissions. The framework for the top-down BACT analysis procedure used by the Department comprises five key steps as follows:

1. Identify all available control technologies with practical potential for application to the specific emission unit for the regulated pollutant under evaluation;
2. Eliminate all technically infeasible control technologies;
3. Rank remaining control technologies by effectiveness and tabulate a control hierarchy;
4. Evaluate most effective controls and document results; and
5. Select BACT, which will be the most effective practical option not rejected, based on economic, environmental, and/or energy impacts

The applicant searched publicly available information on emission control technologies. The search of these databases revealed no previous BACT determinations for an evaporative spray system and Evaporative spray systems are not identified in the SIP. Therefore, the BACT determination focused on other control technologies that could be feasible for control of PM emissions. The PM emissions from the evaporative spray systems are fugitive in nature and conventional control technologies designed for stacks, like electrostatic precipitators and baghouses are not feasible. Three technologies were identified for the BACT evaluation: Fugitive dust controls (wind fence, dust suppression); reclaiming pond water for in-plant use using reverse osmosis; and construction of additional evaporation ponds.

The following summarizes the rationalization in which the applicant eliminated the infeasible control technologies:

1. Conventional dust controls. The proposed spray evaporative system does not have a stack and could not be fitted with a stack. Therefore, conventional dust control technologies applicable to stacks such as electrostatic precipitators and baghouses are not feasible for this situation.
2. Fugitive dust control. Watering and dust suppressants are not feasible control methods. Wind screens were also not feasible because of the height required and prevailing wind issues.
3. Reverse osmosis (RO). An RO system would allow additional pond water to be

reused in the plant. It is estimated that two portable RO systems are needed to handle the added throughput. The annualized cost for two systems would be \$4,900,000. See Appendices A and D for the detailed cost estimate breakdown. The PTE of PM<sub>30</sub> emissions from the EWS system is 1, 978 TPY. The cost effectiveness to treat the process water throughput represents an economic impact of \$2,509 per ton of PM<sub>30</sub>. This economic impact must be weighed against the fact that 90% of the anticipated PM<sub>30</sub> from the proposed project will fall to the ground within approximately 1 mile of the property boundary and 100% is anticipated to fall within approximately 2.5 miles. Additional costs would be associated with hauling solid waste from the site that was generated by the RO system. Transportation related combustion emissions from waste hauling are another negative impact associated with an RO system.

4. Additional evaporation ponds. The construction cost to build the required pond area to handle the evaporation needs was estimated to be \$60,000,000, which equates to \$3,925 per ton of PM<sub>30</sub>. There would be additional environmental impacts resulting from the construction of the ponds. This technology is considered to be an excessive economic impact. See Appendices C and D for the detailed cost estimate breakdown.

The alternative technologies identified in the BACT analysis were either technologically infeasible or represented an excessive economic cost when compared to the environmental benefits they produced. The evaporative spray system is feasible, a lesser economic burden, and has minimal adverse environmental impacts.

## V. AIR QUALITY IMPACT ANALYSIS

The evaporative water system does not generate particles sized less than 10 microns. Section III above provides a detailed description of PM emission disposition. There are no National Ambient Air Quality Standards (NAAQS) for emissions of particulate matter greater than 10 microns in diameter. Therefore, no Air Quality Impact Analysis is required.

## VI. APPLICABLE REGULATIONS

The applicable regulations have been identified that apply to the planned Evaporative Spray Systems to be installed at the evaporation ponds, which is the subject of this permit application. Table 2 below summarizes the applicable regulations.

**Table 2:- Regulatory Review**

Unit ID	Control Equipment	Applicable Regulations	Verification
Spray Evaporation Systems	N/A	A.A.C. R18-2-702.B A.A.C. R18-2-702.C	The opacity standards from A.A.C R18-2-702 apply to point fugitive sources. The spray nozzles are a point source because they are an identifiable emission point. However, the emissions are fugitive because they could not reasonably pass through a stack or other functionally equivalent opening.

Unit ID	Control Equipment	Applicable Regulations	Verification
Spray Evaporation Systems	N/A		
		A.A.C. R18-2-730.D A.A.C. R18-2-730.F A.A.C. R18-2-730.G	The standards from A.A.C. R18-2-730 apply to point fugitive sources.
		A.A.C. R18-2-406.A.4	BACT applies to this project because it occurs at a major source and will result in an increase in PM emissions above the significance level.

## VII PERIODIC MONITORING

Periodic monitoring is not required for the Evaporative Water Spray Systems.

## VIII TESTING REQUIREMENTS

Testing is not required for the Evaporative Water Spray Systems.

## IX. NEW INSIGNIFICANT ACTIVITIES

There are no new insignificant activities.

## X. LIST OF ABBREVIATIONS

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
BACT	Best Achievable Control Technology
CFR	Code of Federal Regulations
CO	Carbon Monoxide
EWS	Evaporative Water Spray System
HAP	Hazardous Air Pollutant
NAAQS	National Ambient Air Quality Standards
NO <sub>x</sub>	Nitrogen Oxides
MW	Megawatt
PM	Particulate Matter
PM <sub>10</sub>	Particulate Matter with a diameter less than 10 micrometers
PM <sub>30</sub>	Particulate Matter with a diameter less than 30 micrometers but greater than 10 micrometers
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
RO	Reverse Osmosis
SGS	Springville Generating Station
SIP	State Implementation Plan
SO <sub>2</sub>	Sulfur Dioxide
TEP	Tucson Electric Power
VOC	Volatile Organic Compound